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ENERGY CONSERVATION, COST REDUCTION & DEVELOPING ALTERNATE SOURCE OF ENERGY IN PULP & PAPER SECTOR

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Abstract:

Meeting the rising of energy demand and limiting its environmental impact are the two intertwined issues faced in the 21st century. Governments in different countries have been engaged in developing regulations and related policies to encourage environmental friendly renewable energy generation along with conservation strategies and technological innovations.

Excessive Energy usage can cause serious environmental pollution.

Fortunately, we can reduce greenhouse gas emissions by Alternate source of Energy.

Seshasayee Paper and Boards Limited always focus on a socially responsible manner to protect the environment by adopting new technologies with reduced primary energy consumption produced by fossil fuels and contributing towards net zero emissions.

In this paper, we explain the contribution of **SPB** for 'Net Zero Emissions' by Energy conservation, cost Reduction and Alternate sources of Energy.

Keywords: Energy demand, Economy, Net zero emissions.

1. Introduction

1.1 About us

Seshasayee Paper & Boards Limited was established in 1960 and commenced commercial production in 1962 on commissioning a 20000 TPA integrated facility in Erode unit, with comprising a pulp mill with two paper machines PM-1 & PM2.

1.2 MDP for capacity enhancement

- In the year 1967-1968 by up gradation of PM-2 and addition of a PM-3, Capacity was expanded to 35000 TPA.
- In the year 1976, through addition of a new paper machine PM-4, Capacity was enhanced to 55000 TPA.
- In 2000 by addition of a Pre-owned paper machine PM5, Capacity from 55000 to 115000 TPA.
- In the FY 2015-2018, MDP-2 has helped to increase the production of paper to 132000 TPA.
- In the FY 2019-2020, MDP-3 project expansion cum modernization of paper machine the paper production rose up to 165000 TPA.

2. What is energy?

"Energy can neither be created nor destroyed"

There are many different forms of energy is there. We can only transfer the energy from one form to another form. It means we can store the energy and the energy which was stored can be used. But have to remind that the energy is not a use and throw.

Example, if we burn the candle the chemical energy of wax will be turn into light energy and heat energy. And it will be remains constant when it is in the closed vessel.

Hence, the Energy must be handled efficiently to give the solution for raising of energy demand.

Energy efficiency, involves using advanced technology that requires less energy to perform the same function. But Energy conservation without compromising the usage is a great task.

CONCEPT IS.....

"USE-LESS" ENERGY AND AVOID "USELESS" ENERGY

This is because it only takes a 12-watt (W) LED bulb to give off as much light as a 43-watt halogen bulb or a 60-watt incandescent bulb and it's a simple way to use less electricity.

Now, if you make a conscious decision to turn off those lights every time you leave the room, that's practicing energy conservation

3. Global Energy scenario

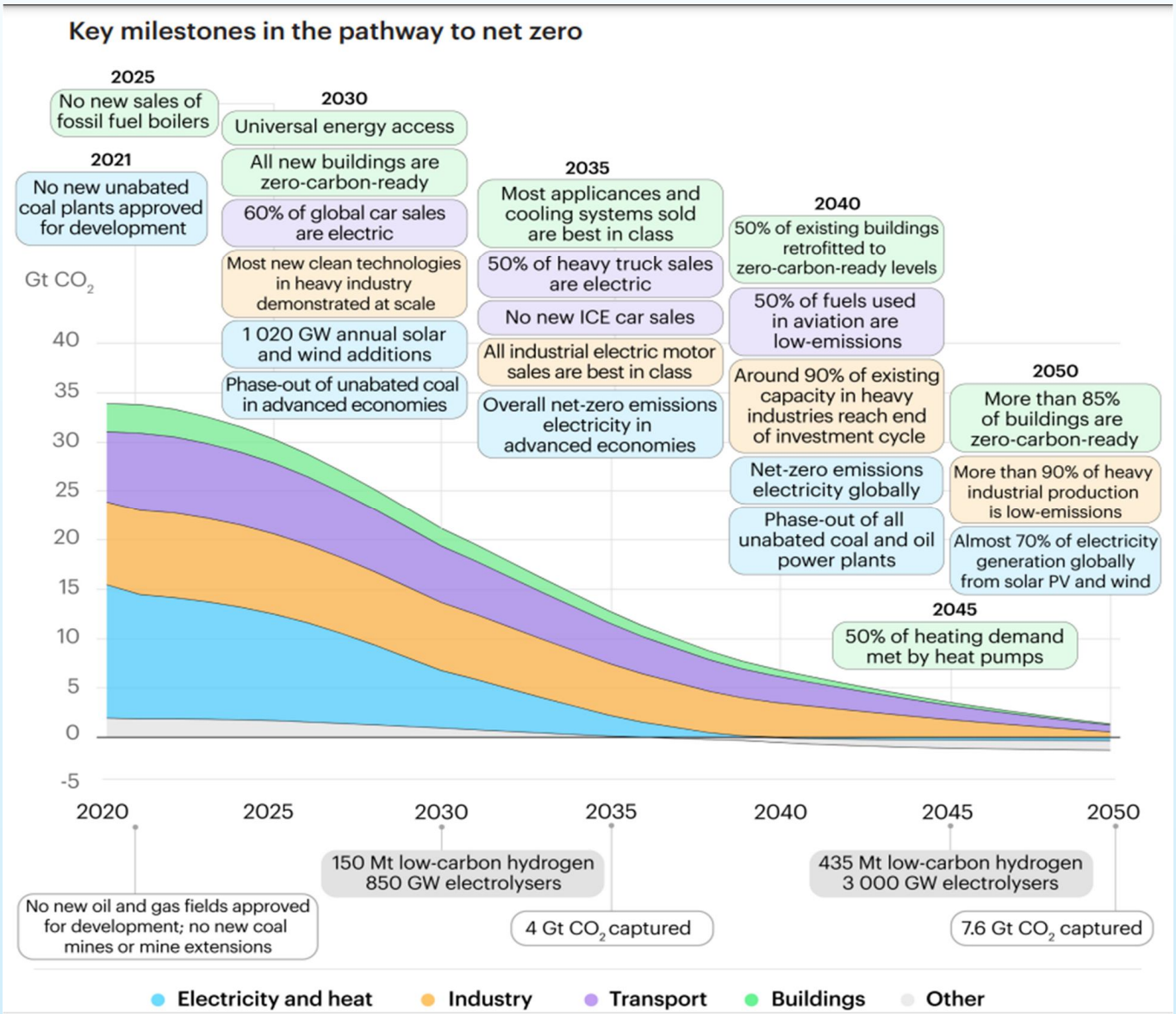

Figure 3 pathway to net zero

- Our world on track to reach net zero emissions by 2050.
- 135 countries have a renewable power targets.
- 156 countries have regulatory renewable power policies.
- 3146 GW of global installed renewable power capacity.
- Levelised costs of onshore wind power and solar PV are now cheaper than fossil fuels on average.
- More than 50% of climate mitigation finance allocated to hydro power, solar PV and wind power.
- 67 countries had mandatory or voluntary building energy codes at the national level.
- Bio-energy grew less than 1% annually between 2010 and 2020.
- From the climate mitigation finance allocated to buildings, 51% is dedicated to solar thermal water heaters.

- 11 countries and 20 cities had a targeted ban on sales of fossil fuel/ICE vehicles.
- 31% of mitigation finance allocated to low carbon transport.
- There are no new Coal, oil and gas fields are approved for development and extensions.
- All new buildings are to be zero-carbon ready.

Figure 3.1 Global Energy scenario

4. Indian Energy scenario

- Globally, India ranks 3rd for total renewable power capacity additions.
- And 4th largest installed capacity of wind power in the world.
- 3rd largest market in the world of new solar photovoltaic capacity.
- India has the 6th largest energy consumer amounting for around 3.4 % of global energy.

India's announcement India that it intends to achieve net zero carbon emissions by 2070 and to meet 50% of its electricity from renewable energy sources by 2030.

In accordance with Honourable Prime Minister's announcement at COP26 in Glasgow, Ministry of New and Renewable Energy is committed to achieving 500 GW of installed electricity capacity from non-fossil fuel sources by 2030.

In the Union budget 2022-2023, the government allocated RS.19, 500 crore for a PLI scheme to boost manufacturing of high-efficiency solar modules.

India launched the mission innovation cleantech exchange, a global initiative that will help accelerate clean energy innovation.

A total of 161.28 GW of renewable energy capacity projects have been installed in the country as of July-2022.

Which includes,

- 50.78 GW from solar power,
- 40.13 GW from wind power,
- 10.63 GW from Bio-power,
- 4.84 GW from small hydropower and
- 46.52 GW from large hydropower.
- 0.47 GW from waste to energy.

5. Energy intensive industry

Undoubtedly, boilers and the drying of the paper is the most energy-intensive part of the paper production.

The consumption of steam and electricity per tonne of paper production in India is around 11 to 15 tonnes and around 1,300 to 1,700 kWh. The average specific energy is placed at around 50 GJ per tonne of paper.

The industry is likely to consume approximately 730 PJ per annum of energy in 2020 and 1702 PJ per annum in 2030. It is expected to contribute 76 million tCO2 per annum and 164 million tCO2 per annum of GHG emissions in 2020 and 2030, respectively.

The cost of energy is estimated to be 16 to 25 percent of the total production cost of paper, and the component of energy cost is expected to increase over other inputs in near future.

Energy consumption in paper mills varies in accordance with the type of raw material and technology in use. Coal and electricity are the main sources of energy used in paper production.

The Indian paper industry has been able to reduce its energy consumption by 20 to 25 percent in the last ten years or so. Also, the Perform Achieve Trade (PAT) scheme of the Government has encouraged the industry to change.

Tamil Nadu, for instance, now expects industry to use about 6% of energy requirement from the solar-energy sector. But the need for greater energy efficiency still remains.

6. SPB Manufacturing focus on

- Minimizing Environmental impact and Global Warming,
- Elimination of Wastes,
- Maximizing Green Resources in our Business,
- Sustainable Development,
- Improvement in performance efficiency and profitability.

6.1 SPB Contribution in the Energy sector

- We are working on the sustainability of Raw material and Energy.
- Pioneer in circular Economy concept.
- We are Participating and discussing with Policy makers like BEE, IPPTA, and CII for the benefit of the Industry and development.
- We share the best practices followed by us to all PEERS in the industry.
- We are aligned to Energy Conservation committed to the National energy goal.
- We are being the National leader in Energy. And regularly conduct training for energy auditors/energy managers as per BEE.

7. Teamwork & Employee involvement

7.1 Energy management team

Energy expenses are unavoidable. One of the best ways to manage energy and improve efficiency is to create an energy management team. We have a good energy management team for handle all the information and calculate the usage of energy for helping to save the energy

- Team must have a representative from each department
- Get the lay of the land
- Set your goals
- Create a plan to monitor energy usage
- Make the team implement ideas to save energy
- Add incentives and bonus to make people work hard.

7.2 Energy Audits

"Energy audit programmes are inexpensive investments"

One of the important ways to improve the energy conservation is energy audit.

Energy audit will help us to quantify energy consumption of each department, peak consumption times and days where the waste is happening. After the audit is done, our team will recommend the necessary steps for achieving better energy efficiency of industry and saving the cost.

We will take the notes and photographs during implementation. So we have a baseline for measuring our progress for meeting the specific energy-improvement goals.

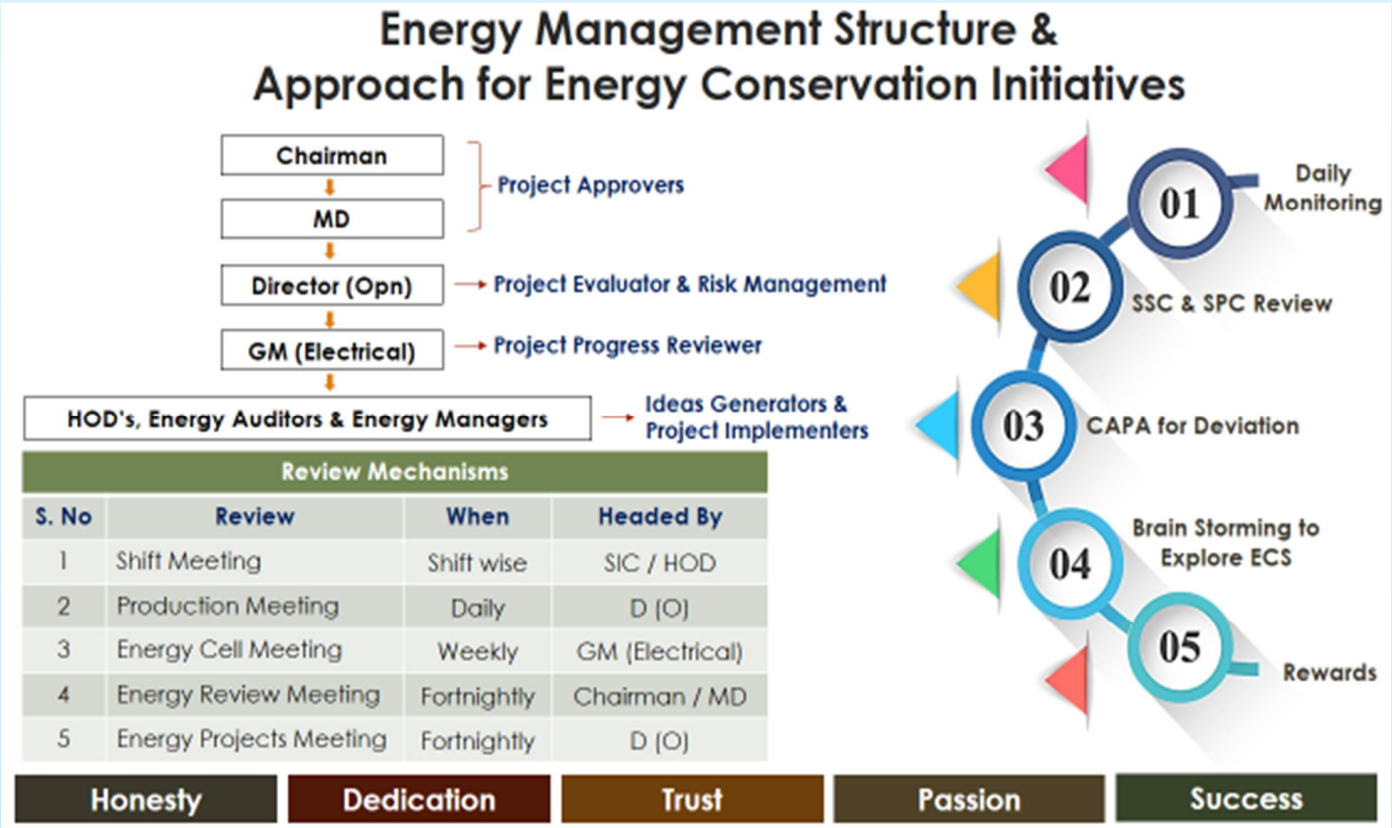

Figure 7 maintain the momentum

7.3 Energy Auditor

Once the audit has done, our energy auditor will prepare a detailed report about our technical feasibility, financial requirements, time frame needed and possible gains that can be achieved through that proposed project.

Investment related energy saving proposals require the consent of the management. In such cases, the decision making does not rest with energy auditor.

7.4 Energy Manager

The Audit report will be reviewed by Our energy manager who have an excellent managerial skills in order to plan, organize, direct and control our energy management team and who have been regularly conduct events and activities where we can promote our goals, and come up with fresh ideas.

POWER Distribution GROUP	KW : 1260.12	KWH : 1993.73
Machine	KW	KWH
11kv I/C	1260.12	1993.73
3.3kv I/C	1241.60	1968.00
SB2A I/C	358.50	718.00
SS25	0.00	0.00
SS26	0.00	0.00
SS27	378.82	643.07
SS28	95.60	22.53
SS29	213.07	386.82
SS30	360.85	722.94
SS31	24.92	44.29

Refiner GROUP	KW : 0.00	KWH : 0.00
Machine	KW	KWH
R201	0.00	0.00
R202	0.00	0.00
R203	0.00	0.00
R204	0.00	0.00
R205	0.00	0.00
R207	0.00	0.00

Machine	KW	KWH
M/C Drives	0.00	0.00
M/C Aux	474.42	665.60
Stock Aux	358.50	718.00

Vacuum Pump GROUP	KW : 0.00	KWH : 0.00
Machine	KW	KWH
P590	0.00	0.00
P591	0.00	0.00
P592	0.00	0.00
P593	0.00	0.00
P594	0.00	0.00
P595	0.00	0.00
P596	0.00	0.00

Compressor GROUP	KW : 201.77	KWH : 415.36
Machine	KW	KWH
Compressor-451	18.17	58.37
Compressor-452	0.00	0.00
Compressor-453	88.79	172.16
Compressor-454	94.81	184.83

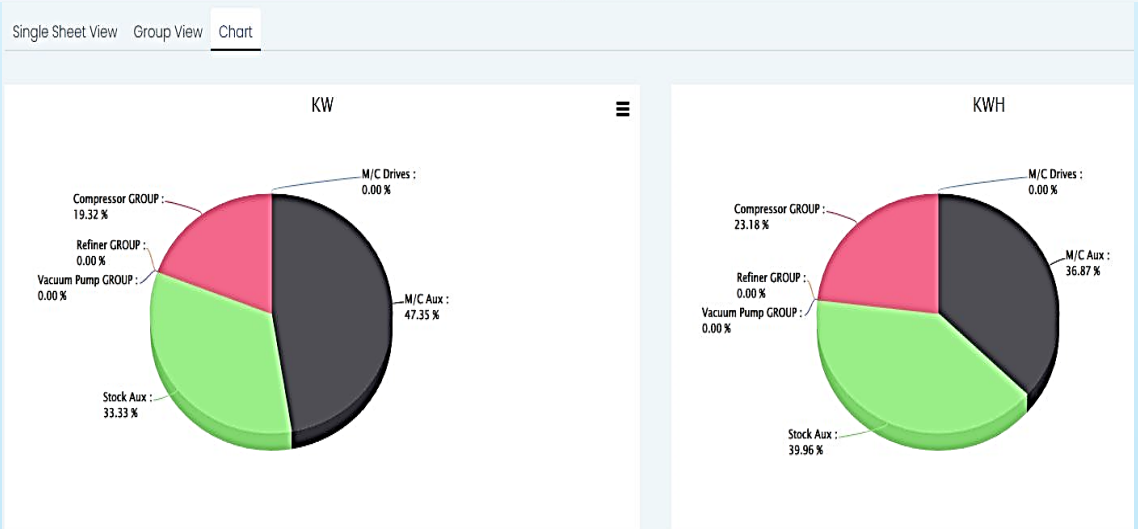

Figure 7.1 Online Energy monitoring system

8. Greenhouse gas Inventorization

In 2018, the Intergovernmental Panel on Climate Change (IPCC) published a special report on the impacts of global warming at 1.5 °C above pre-industrial levels, including various greenhouse gas (GHG) reduction pathways and strategies.

They predicted that this level of warming will occur by 2040. At 2°C above pre-industrial levels, loss in biodiversity and severe flooding risks increase for coastal regions.

This mark, however, can still be prevented, making GHG research critical, as it provides a basis for identifying effective GHG reduction strategies.

. It is expected to contribute 76 million tCO2 per annum and 164 million tCO2 per annum of GHG emissions in 2020 and 2030, respectively.

SPB contribution towards GHG Reduction,

- **Work on group captive solar model,** to increase the renewable energy share.
- **Increase in usage of Biofuel** and increase the Renewable Energy share up to 70%.
- **Collection of CNG** from unit II and fire in unit I lime kiln (600 MT / year of oil replacement)
- **Purchase Policy** Buying products based on Energy labelling.
- **Green Procurement Policy** which focus on reduction in energy and procuring green products.

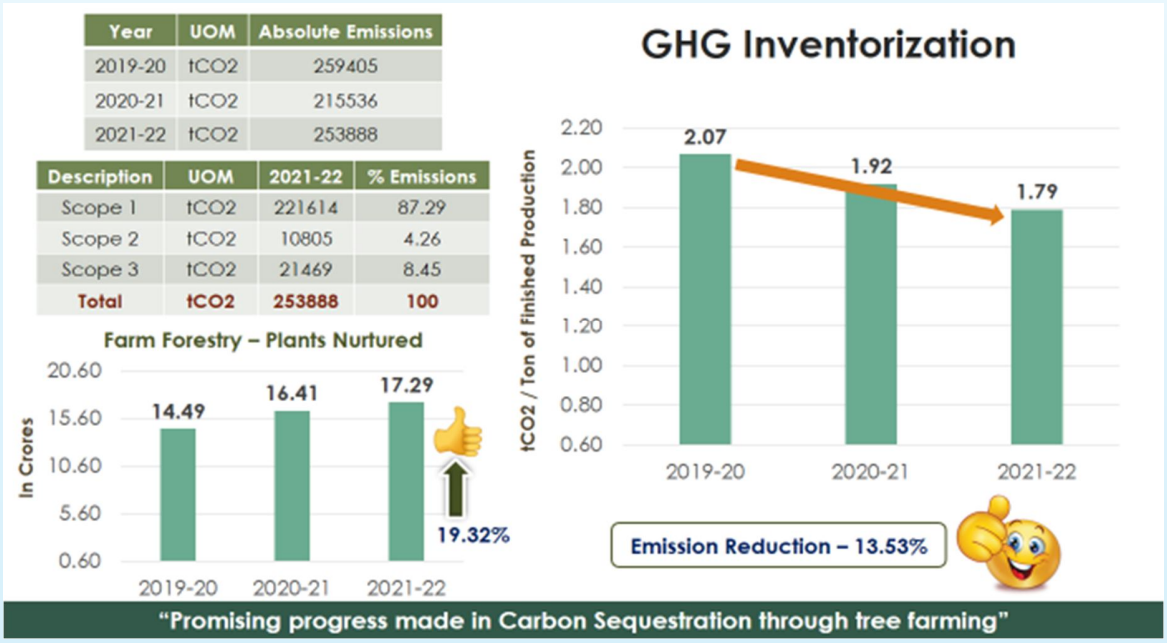

Figure 8 GHG Inventorization in SPB

8.1 Renewable Energy Sources

Pulp and paper industries have great potential and prospect for resources of renewable energy. These resources are generated from almost all stages of the pulp and paper manufacturing process. Example, which includes bark, sawdust, wood waste, pins, fines, knots, black liquor, wet pith, lime sludge and lime grits also fly ash.

The pulp and paper sector was responsible for about 190 Mt of CO_2 emissions in 2021, significant efforts must be made to reduce the emissions intensity of production.

This can be accomplished primarily by moving away from fossil fuels as an energy source and encouraging innovation on technologies that reduce the amount of heat needed for pulp and paper drying.

SPB contribution towards Renewable Energy,

- Usage of Bio fuel to reduce fossil fuel consumption in CPP – **40 TPD coal reduction.**
- Usage of Bio gas to reduce fossil fuel consumption in Lime kiln – **3.5 TPD Furnace oil reduction.**
- Usage of Top roof solar system.
- Substitution of overall Renewable energy by 61.50% in FY 2021-2022.

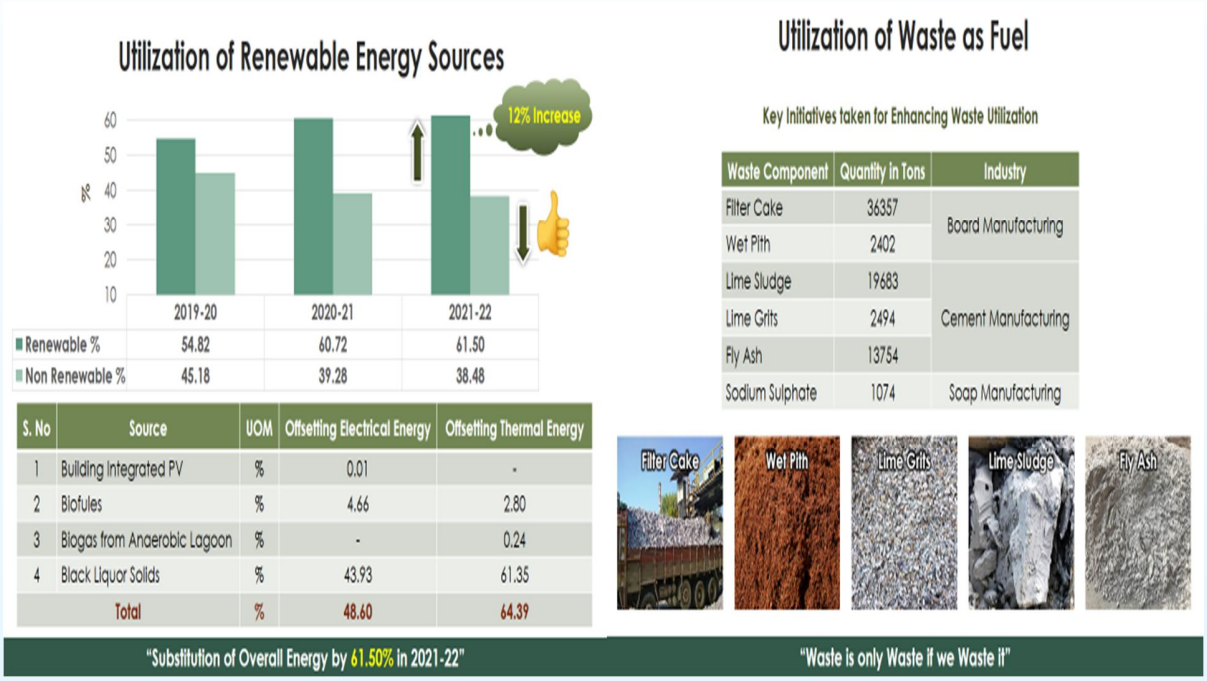

Figure 8.1 Utilization of Renewable Energy source in SPB

9. Net Zero Emissions

"Net Zero Emissions" is to achieve an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere. It is also described as 'carbon neutrality' and sometimes 'climate neutrality'. The feasible pathways to achieve net zero emissions

- Generate electricity without emissions,
- Use vehicles and equipment that are powered by electricity instead of fossil fuels,
- Use energy more efficiently,
- Remove carbon dioxide from the atmosphere.

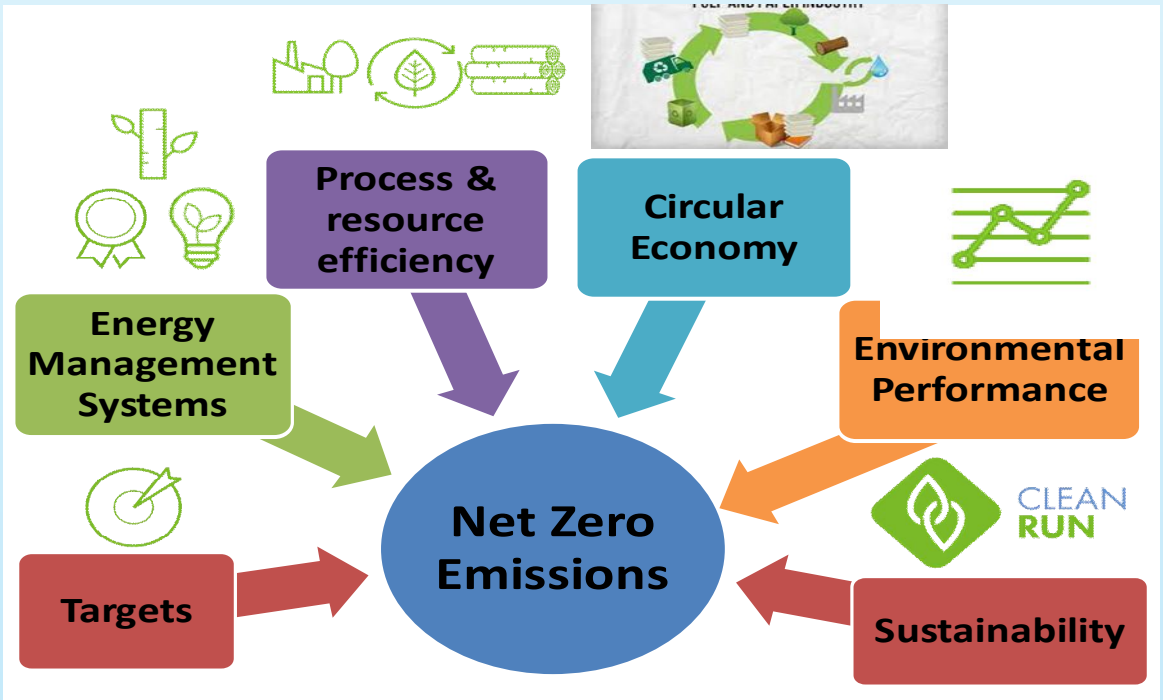

Figure 9 Net zero Emissions

9.1 Road Map to Net Zero & Future Projects of SPB

Initial stage [2015-2023]

- 27% reduction in Operations Emissions (FY 15-16: 2.46 tCO_2; FY 21-22: 1.79 tCO2)
- 100% FSC Certified Wood Procurement - Achieved
- Increase Renewable Energy Source to 70% (FY 21-22: 61.50%)
- Carbon Neutral through Farm Forestry Management – 15 tCo_2 (Last 3 years) – Already we are Carbon Positive.

Mid-term plan [2023-2027]

- Procurement of more Indigenous material
- ISO 50001 EnMS Certification by 2023
- Installation of PCC plant by Dec 2022 – 8050 TPD of CO_2 reduction
- Process heating by Solar thermal
- Elimination of Plastics in our product
- Biomass heating with flue gas.

Long term plan [2027-2030]

- Hybrid Energy (Solar)
- Supplier Emission Reduction by 40%
- Scale up Renewable Thermal Energy Innovations
- Scaling up Pulp Production for Self Sufficiency & increasing Renewable Energy to the level Of 75% to 80%

10 Conclusion

To sum up, energy conservation must be among the utmost priorities of humanity. Hence immediate implementation of energy conservation measures is certainly of paramount importance to achieve the national goal towards the Net Zero.

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